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10/679,625	10/07/2003	Dae-Ho Choo	6192.0316.US	3336

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EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 10/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/679,625	CHOO ET AL.	
	Examiner	Art Unit	
	Thoi V. Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* ~~is~~/are pending in the application.

4a) Of the above claim(s) *36-57* ~~is~~/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12 and 14-35* ~~is~~/are rejected.

7)☒ Claim(s) *11 and 13* ~~is~~/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-35 in the reply filed on August 12, 2005 is acknowledged.

Accordingly, claims 1-57 are pending in this application, of which claims 36-57 are withdrawn and claims 1-35 are considered in this office action.

Claim Objections

2. Claim 11 is objected to because of the following informalities: claim 11 recites the limitation "the second frame" in line 7. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

3. Claim 13 is objected to because of the following informalities: claim 13 recites the limitation "the second frame" in line 7. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6, 7, 9, 10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Chaudhary et al. (Chaudhary, USPN 6,124,914).

Re claim 1, as shown in Fig. 8, Chaudhary discloses a method of forming a multi-domain for aligning liquid crystal, comprising:

forming an alignment film on a substrate (col. 5, lines 27-29);

scanning the alignment film with an atomic beam irradiated in a first direction 74 to form a first domain 76 in a first region of the first alignment film; and

scanning the alignnent film with the atomic beam irradiated in a second direction to form a second domain 78 in a second region of the first alignment film,

wherein, re claim 2, the alignment film comprises polyimide (col. 5, lines 27-29).

Re claim 3, as shown in Fig. 9A, the atomic beam 86 is irradiated only in the first region of the first alignment film via a first mask 80 having a first opening that exposes the first region 82,

wherein, re claim 4, the first mask makes contact with a surface of the first alignment film formed on surface 84 of substrate 78 (col. 5, lines 27-29 and 48-52).

Re claim 6, as shown in Fig. 9A, the atomic beam 86 is irradiated only in the second region 78 of the first alignment film via a second mask 80 having a second opening that exposes the second region (col. 5, lines 56-60),

wherein, re claim 7, the second mask 80 makes contact with a surface of the first alignment film formed on surface 84 of substrate 78.

Re claim 9, as shown in Fig. 1, the atomic beam 38 is formed by (col. 4, lines 7-45):

dissociating atoms (in the discharge plasma region 12) to transform the atoms into ions;

accelerating the ions (by accelerator grid) to form an ionic beam; and

neutralizing the ionic beam (by neutralizer 42) to transform the ionic beam into an atomic beam.

Re claim 10, as shown in Fig. 9B, the atomic beam 96 is irradiated only in the (first) region 98 of the first alignment film via a (first) floating mask 90 having a (third) opening that exposes the (first) region 98, the (first) floating mask being disposed over the first alignment film (col. 5, lines 27-30 and 52-60).

Re claim 12, as shown in Fig. 9B, the atomic beam 96 is irradiated only in the (second) region 98 of the first alignment film via a (second) floating mask 90 having a (fourth) opening that exposes the (second) region 98, the (second) floating mask being disposed over the first alignment film (col. 5, lines 27-30 and 52-60).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhary et al. (Chaudhary, USPN 6,124,914) in view of Seliger (USPN 4,101,782).

As shown in Fig. 9A, Chaudhary discloses a mask 80 formed on substrate 78 coated with alignment material. However, Chaudhary does not disclose that the mask corresponds to an aluminum oxide layer.

Seliger discloses an ion absorption mask comprising an aluminum oxide layer which can be served as a thin taut supporting membrane adapted to pass high energy ions to the exposed areas (col. 2, lines 11-22).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Chaudhary with the teaching of Seliger by forming a mask corresponding to an aluminum oxide layer coated on the alignment film so as to obtain a thin taut supporting membrane for passing high energy atomic beam to the exposed areas (col. 2, lines 16-22).

8. Claims 14-17, 19-29 and 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Kim, USPN 6,335,776 B1) in view of Chaudhary et al. (Chaudhary, USPN 6,124,914).

Re claim 14, as shown in Figs. 5A and 20A, Kim discloses a method of manufacturing a liquid crystal display device, comprising:

forming first and second electrodes 13 and 15 on a first substrate 31;

forming a first alignment film (not shown) on the first substrate 31 (col. 4, lines 30-62) and col. 6, lines 10-14);

performing alignment-treatment in a first alignment region of the first alignment film in a first direction, the first alignment region corresponding to a first region of the first electrode 13 (upper portion) (Fig. 5A and col. 4, lines 49-59);

performing alignment-treatment in a second alignment region of the first alignment film in a second direction, the second alignment region corresponding to a

second region of the first electrode 13 (lower portion) (Fig. 5A and col. 4, lines 49-59); and

assembling the first substrate 31 with a second substrate 33.

Re claim 25, the method of Kim is similar to claim 14 except that a first electrode 13 is formed on the first substrate 31 and a second electrode 17 is formed on the second substrate 33 (col. 9, lines 45-52).

Kim discloses a method of manufacturing a liquid crystal display device that is basically the same as that recited in claims 14 and 25 except for performing alignment-treatment by irradiating an atomic beam on the alignment film.

As shown in Fig. 8, Chaudhary discloses a method of forming a multi-domain for aligning liquid crystal, comprising:

forming a first alignment film on a substrate 72 (col. 5, lines 27-29);

irradiating an atomic beam in a first alignment region 76 of the first alignment film in a first direction 74; and

irradiating an atomic beam in a second alignment region 78 of the first alignment film in a second direction 110.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of manufacturing a liquid crystal display device of Kim with the teaching of Chaudhary by irradiating an atomic beam in a first alignment region and a second alignment region of the alignment film so as to provide non-contact alignment and minimize the number of radicals induced by broken bonds (col. 3, lines 25-40).

Re claims 15 and 26, Kim discloses that at least one first region and at least one second region are formed on the first electrode (col. 4, lines 49-59).

Re claims 16 and 27, Kim discloses that the first and second region alternate with each other (col. 10, lines 24-35).

Re claim 28, as shown in Fig. 20A, Kim discloses that the second substrate 33 is assembled with the first substrate 31, such that the second electrode 17 faces the first electrode 13.

Re claims 17 and 29, as shown in Fig. 20A, the second substrate 33 comprises a color filter 23 facing the first electrode 13 of the first substrate 31 (col. 9, lines 45-50).

Re claim 19, as shown in Fig. 4A, 5A and 20A of Kim, the first and second electrodes 13 and 15 are formed in the first substrate 31, the first and second electrodes being in parallel with each other.

Re claims 20 and 31, as shown in Fig. 8, Chaudhary also discloses that a second substrate 78 comprises a second alignment film formed thereon, the second alignment film facing the first alignment film of the first substrate 72 (col. 5, lines 27-31), the atomic beam being irradiated in a third alignment region 106 of the second alignment film in a third direction 112, the third alignment region corresponding to the first region 76 of the first alignment film, the atomic beam being irradiated in a fourth alignment region 104 of the second alignment film in a fourth direction 114, the fourth alignment region corresponding to the second region 78 of the first alignment film (col. 5, line 27 through col. 6, line 7).

Re claims 21 and 32, as shown in Figs. 4A and 5A, Kim discloses that the first and second directions (solid line arrow) are in parallel with the third and fourth directions (dotted line arrow) respectively (col. 6, lines 31-43).

Re claims 22 and 33, Kim discloses that a liquid crystal layer is disposed between the first and second alignment films, liquid crystal molecules of the liquid crystal layer are vertically (or homeotropically) aligned with respect to the first and second alignment films (col. 11 line 66 through col. 12, line 2).

Re claims 23 and 34, as shown in Fig. 8 of Chaudhary, the third direction 112 forms a first angle with respect to the first direction 74, and the fourth direction 114 forms a second angle with respect to the second direction 110, the first and second angles being in a range from about 90 degrees.

Re claims 24 and 35, since Fig. 8 of Chaudhary shows a two-domain TN (twisted nematic) (col. 5, lines 30-31), it is obvious that when a liquid crystal layer is disposed between first and second alignment films, the liquid crystal molecules of the liquid crystal layer are aligned to form a spiral shape.

9. Claims 18 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Kim, USPN 6,335,776 B1) in view of Chaudhary et al. (Chaudhary, USPN 6,124,914) as applied to claims 14-17, 19-29 and 31-35 above and further in view of Yamaguchi (USPN 5,976,734).

The method of manufacturing a liquid crystal display device of Kim as modified in view of Chaudhary above includes all that is recited in claims 18 and 30 except for the first substrate comprising a color filter covering the first electrode.

As shown in Fig. 1, Yamaguchi discloses a method of manufacturing a liquid crystal display device comprising forming a color filter 13 covering a pixel electrode 14 (col. 3, lines 40-52).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Kim with the teaching of Yamaguchi by forming a color filter covering the first electrode on the first substrate so as to provide excellent color display characteristics at a low cost with a good yield by a simple process without need of high-precision alignment with black matrices and change in process according to black matrices (col. 2, lines 40-49).

Allowable Subject Matter

10. Claims 11 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: none of the prior art of record fairly suggests or shows all of the limitations as claimed. Specifically, Re claims 11 and 13, none of the prior art of record discloses, in combination with other limitations as claimed, a mask comprising a support frame, and a plurality of first, second and third wires, the support frame having an opening at a center portion of the support frame, each of the first wires being extended in a first direction in the opening, both ends of each of the first wires being connected to an inner wall of the support frame both ends of each of the first wires being connected to an inner wall of the support frame, each of the second wires being extended in a second direction in the

opening, both ends of each of the second wire being connected to the inner wall of the support frame, the first direction being substantially perpendicular to the second direction, both ends of each of the third wires being connected to two neighboring first wires respectively to block a portion of a window formed by the first and second wires from the atomic beam.

The most relevant reference, USPN 5,891,595 to Takeuchi, fails to disclose or suggest a mask comprising a plurality of third wires whose both ends are connected to two neighboring first wires. As shown in Fig. 3, Takeuchi only discloses a wire gauge mask pattern comprising a plurality of first and second wires being perpendicular to each other.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong – 10/19/2005

ANDREW SCHECHTER
PRIMARY EXAMINER